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PATENT SPECIFICATION

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COMPLETE SPECIFICATION

DRAWINGS ATTACHED

Improvements in and relating to the Production of Bulky Yarns

We, COURTAULDS LIMITED, a British Company of 18, Hanover Square, London, W.1., (formerly of 16, St. Martin's-le-Grand, in the City of London, England.), do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to the production of bulky yarns and in particular slubbed bulky yarns.

A process is known (see British Patent Specification No. 732,929) for making bulky yarns by passing a bundle of continuous filaments through a turbulent zone, produced for example, by a high velocity jet of air, to cause the filaments to form loops and convolutions at random intervals and the looped filaments are then twisted together to fix the loops in the yarn.

It is also known (see for example British Patent Specifications Nos. 828,641, 861,327, 899,811 and 899,812) that two or more bundles of continuous filaments may be fed into a single turbulent zone at different speeds, withdrawn as a single assembly and twisted, various conditions being selected to obtain effects in the final yarn.

The object of this invention is a simple process for making slubbed bulky yarns using a turbulent zone.

In accordance with the present invention a process for the production of slubbed bulky yarns comprises feeding at least one bundle of continuous filaments to a zone of turbulent fluid, separately feeding intermittenlty at least one bundle of staple fibres to the turbulent zone, and withdrawing all the bundles from the zone as a single assembly.

The invention also includes slubbed bulky yarns made by the process and fabrics incorporating the yarns.

For brevity the bundle or bundles of continuous filaments will be referred to as the core bundle and the bundle or bundles of staple fibres will be referred to as the effect bundle. We use the term 'core bundle' because it may comprise one or more yarns, i.e. a 'bundle' of yarns. There must be one continuous filament yarn present in the core bundle, any other yarns may be comprised of staple fibres or continuous fibres. The term 'effect bundle' is used for a like reason, in that, the effect bundle may comprise one or more staple yarns.

The intervals of time between the feeding of the effect bundle, and the time for which the effect bundle is fed may be varied in a random manner. Any known method may be employed for feeding the effect bundle intermittently or at different rates to the turbulent zone. For example, one method is to have the yarn passing from a tensioning device through a guide to draw rollers, the guide being moved in a random manner so that the effec bundle is alternately gripped and drawn forward by the draw rollers and not gripped by the draw rollers so that it is held back by the tensioning device. Another method is to use draw rollers which are grooved or not circular in cross section at some point so that during their rotation they move the effect bundle forward intermittently.

When both core and effect bundles are being fed to the jet, a slub is being formed. However, it has been found that when the feed of the effect bundle to the turbulent zone is stopped, it breaks, partly due to the untwisting and dragging action of the gaseous fluid, and partly due to the dragging action of the already intermingled continuous filaments of the core bundle and

fibres of the effect bundle. Due to the dragging action of the fluid, which passes through the turbulent zone predominantly in the direction of passage of both the bundles, the broken end of the effect bundle remains within the turbulent zone, and when the feed of the effect bundle is restarted the effect bundle again passes through the turbulent zone with the core bundle, and starts forming a slub again.

The turbulent zone used in the process of the invention may for example be produced by a jet of the type disclosed in British Patent Specification No. 732,929.

In this specification the ratio of the speed at which a bundle of filaments is fed to the zone of turbulent fluid over the speed at which it is taken up from the jet, for example by an output godet, is defined as its bulking ratio.

The only restriction on the bulking ratio of the core bundle is occasioned by the necessity for the core bundle being bulked sufficiently to allow the fibres of the effect bundle to become intermingled with the continuous filaments of the core bundle and to be held by it We have found that a useful lower limit for the bulking ratio of the core bundle is about 1.02. The upper limit for the bulking ratio of the core bundle depends on whether the core bundle comprises more than one individual bundle and on the characteristics of the yarn or yarns in the core bundle. Preferably one of the yarns of the core bundle should have a low bulking ratio, i.e. one in the range of 1.02 to 1.5.

One of the yarns of the core bundle may be a scaffolding thread, i.e. it may be completely unbulked and have a bulking ratio of 1.0. Alternatively a scaffolding thread may be incorporated in the assembly by running in the scaffolding thread with the assembly beyond the turbulent zone so that the scaffolding thread and the assembly are twisted together. A purpose of the scaffolding thread is to strengthen the assembled yarn during processing and it may be removed after processing of the yarn into a fabric, for example by the action of a solvent, or it may be retained in the fabric to make it more durable or to provide an additional bulky effect.

The bulking ratio of the effect bundle, when it is passing through the turbulent zone, is again limited only by the necessity of obtaining a single assembly, that is the fibres of the effect bundle must be firmly held by the filaments of the core bundle. Thus the bulking ratio of the effect bundle may again be as low as 1.02. The upper limit for the bulking ratio of the effect bundle may be well over 10.

The bundles of continuous filaments and staple fibres used may be of the same colour or different colours, different types of filaments and/or fibres may be employed and differential dyeing may be employed to dye the assembly. All or some of the filaments and fibres may be of varying denier.

The characteristics of slubs produced by the process of this invention depend on the amount of twist in the effect bundle. If a high twist bundle is employed, breakage does not occur very easily when the feed is stopped. We therefore prefer to use a low twist bundle for the effect bundle. We also prefer to use a low twist core bundle so that the filaments are more readily separated in the turbulent zone and the effect bundle better entwined among the filaments so that they are more firmly held in the finished yarn.

The process of this invention can be carried out using any of the yarns described in British Patent Specifications Nos. 732,929, 828,641, 861,327, 899,811 and 899,812, as the core bundle. It will also be appreciated that a single bundle of staple fibres could be part of a core bundle at one point in an assembly and the effect bundle at another point by suitable manipulation of the speeds of the two bundles.

The characteristics of the slubs also depend on the length of the staple fibres in the effect bundle.

Any man-made fibrous material may be used in the invention for the continuous filaments of the core yarn and the staple fibres of the effect yarn, for example, regenerated cellulose, polyamide, polyolefin, polyester, cellulose acetates or acrylic polymers. The staple fibres of the effect yarn may also comprise material of natural origin, for example wool and cotton.

The fluid used in the process of the invention may be any fluid substance which does not deleteriously affect the core and effect bundles. However we prefer the fluid to be gaseous for example, air. If desired the fluid may be heated but preferably the fluid is at ambient temperature.

One form of apparatus in which the process of this invention may be carried out will now be described, by way of example, with reference to the drawings accompanying the provisional specification, in which:

Figure 1 is a diagrammatic sectional view of the apparatus, and

Figure 2 is a diagrammatic plan of the apparatus.

A core bundle 1 is fed through a pair of nip rollers 2 to the turbulent zone of a jet 3 and thence to a take-up godet 4. An effect bundle 5 is fed via a tensioning device 6 to a pair of nip rollers 8 via a guide 7. The guide 7 slides between two positions 7 and 7*a*. When it is in position 7 the effect bundle is not fed by the nip rollers 8 and so

is held back by the tensioning device 6. When the guide is in position 7*a* the effect bundle passes between the nip rollers 8 and so is pulled through the tensioning device 6 and fed to the jet 3.

The guide 7 is preferably moved at random intervals so as to produce slubs of random length at random distances apart.

A slubbed bulky yarn produced on the above described apparatus was produced as follows :—

The core bundle was continuous filament viscose yarn comprising 40 filaments of total denier 200 and had an input speed of 8.6 yards/min.

The effect bundle was 18's cotton count staple fibre viscose yarn dyed blue and composed of filaments of 3 denier having a staple fibre length of 17/16 inch. The effect bundle was fed intermittently at random at 75 yards/min. to the turbulent zone of the jet.

Air was fed to the jet at a pressure of 40 p.s.i.g. The take-up speed of the assembled slubbed bulky yarn was 8.3 yard/min. The bulking ratios of the core bundle and effect bundle were 1.035 and 9.05 respectively.

WHAT WE CLAIM IS :—

1. A process for the production of slubbed bulky yarns comprising feeding at least one bundle of continuous filaments to a zone of turbulent fluid, separately feeding intermittently at least one bundle of staple fibres to the turbulent zone and withdrawing all the bundles from the zone as a single assembly.

2. A process as claimed in Claim 1 wherein the fluid is gaseous.

3. A process as claimed in Claim 2 wherein the fluid is air.

4. A process as claimed in any of Claims 1 to 3 wherein the bundle of continuous filaments is fed to the zone of turbulent fluid at such a rate that its bulking ratio as hereinbefore defined is in the range of from 1.02 to 1.5.

5. A process as claimed in any of Claims 1 to 4 wherein the bundle of staple fibres which is fed intermittently to the zone of turbulent fluid is fed at such a rate that its bulking ratio as hereinbefore defined is greater than 1.02.

6. A process as claimed in any of the preceding claims where the bundle of continuous filaments and the bundle of intermittently fed staple fibres are of the same colour.

7. A process as claimed in any of Claims 1 to 5 in which the bundle of continuous filaments and the bundle of intermittently fed staple fibres are of different colours.

8. A process as claimed in any of the preceding claims where the bundle of intermittently fed staple fibres is fed at varying rates.

9. A process as claimed in any of the preceding claims wherein the bundle of continuous filaments or a bundle of staple fibres being fed to the zone of turbulent fluid comprises filaments of regenerated cellulose, cellulose acetates, polyamide, polyolefin, polyester or acrylic polymers.

10. A process as claimed in any of the preceding claims wherein the bundle of continuous filaments and the bundle of intermittently fed staple fibres comprise filaments of the same material.

11. A process as claimed in any of the preceding claims where the intermittent feeding of the bundle of staple fibres is regulated by passing the bundle through a tensioning device and through or around a movable guide which at one limit of its movement causes the bundle to be gripped by a pair of rollers and fed to the zone of turbulent fluid and at the other limit of its movement causes the bundle not to be gripped by the rollers and so to be restrained from forward movement by the tensioning device.

12. A process as claimed in any of Claims 1 to 10 wherein the intermittent feeding of the bundle of the staple fibres is regulated by passing the bundle through a tensioning device and a pair of rollers which are grooved or not circular in cross section at some point so that during the rotation of the rollers the bundle is alternately gripped and not gripped and thus moved forward when gripped and restrained by the tensioning device when ungripped.

13. A process as claimed in any of Claims 1 to 11 wherein the intermittent feeding of the bundle of staple fibres is at random.

14. A process as claimed in any of Claims 1 to 9 and Claims 10 to 13 wherein the assembled bulked yarn comprises different types of filaments and fibres and differential dyeing is used to dye the assembly

15. A process as claimed in any of the preceding claims wherein a scaffold thread is incorporated into the assembled slubbed bulked yarn either by making it part of the continuous filament bundle or by twisting it with the continuous filament bundle and the staple fibre bundle after they have left the turbulent zone.

16. A process as claimed in Claim 1 as hereinbefore described with reference to the drawing accompanying the provisional specification and the example relating thereto.

17. A slubbed bulky yarn made by a process comprising feeding at least one bundle of continuous filaments to a zone of turbulent fluid, separately feeding intermittently at least one bundle of staple fibres

to the turbulent zone and withdrawing all the bundles from the zone as a single assembly.

18. Fabrics containing yarn as claimed in Claim 17.

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1 SHEET

PROVISIONAL SPECIFICATION

This drawing is a reproduction of the Original on a reduced scale.

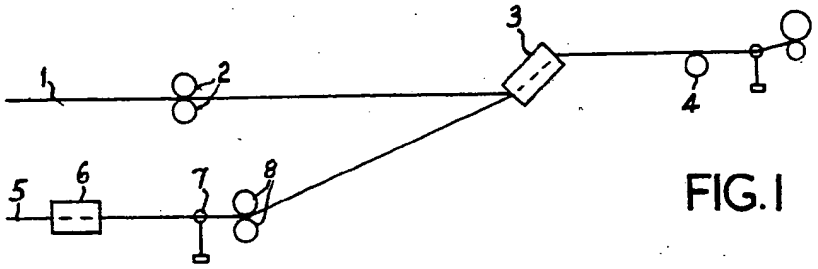

FIG. 1

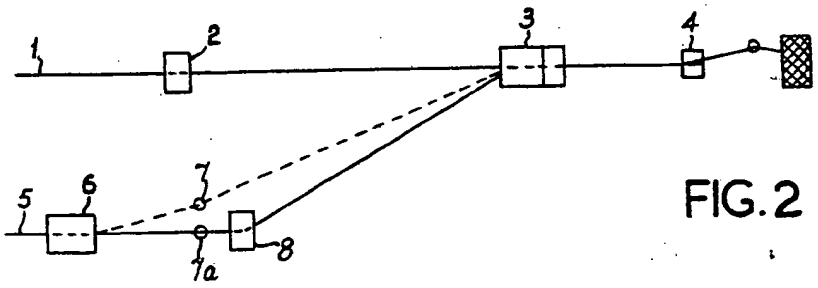

FIG. 2